CHAPTER 4

POINT AND NONPOINT SOURCE CHARACTERIZATION OF THE UPPER CUMBERLAND RIVER WATERSHED

4.1. BACKGROUND. This chapter is organized by HUC-12 subwatershed, and the description of each subwatershed is divided into four parts:

i. General description of the subwatershed
ii. Description of point source contributions
ii.a. Description of facilities discharging to water bodies listed on the 2004 303(d) list
iii. Description of nonpoint source contributions

The Tennessee portion of the Upper Cumberland River Watershed (HUC 05130103) has been delineated into two HUC 10 (10-digit) subwatersheds, each of which is composed of one or more HUC-12 subwatersheds.

Information for this chapter was obtained from databases maintained by the Division of Water Pollution Control or provided in the WCS (Watershed Characterization System) data set. The WCS used was version 2.0 (developed by Tetra Tech, Inc for EPA Region 4) released in 2003.

WCS integrates with ArcView® v3.x and Spatial Analyst® v1.1 to analyze user-delineated (sub)watersheds based on hydrologically connected water bodies. Reports are generated by integrating WCS with Microsoft® Word. Land Use/Land Cover information from 1992 MRLC (Multi-Resolution Land Cover) data are calculated based on the proportion of county-based land use/land cover in user-delineated (sub)watersheds. Nonpoint source data in WCS are based on agricultural census data collected 1992–1998; nonpoint source data were reviewed by Tennessee NRCS staff.

Figure 4-1. The Tennessee Portion of the Upper Cumberland River Watershed is Composed of Two USGS-Delineated Subwatersheds (10-Digit Subwatersheds). *Locations of Celina and Moss are shown for reference.*

4.2. CHARACTERIZATION OF HUC-10 SUBWATERSHEDS. The Watershed Characterization System (WCS) software and data sets provided by EPA Region IV were used to characterize each subwatershed in the Tennessee portion of the Upper Cumberland River Watershed.

HUC-10	HUC-12
0513010305	051301030501 (Otter Creek)
0513010307	051301030708 (Kettle Creek)
	051301030709 (McFarland Creek)
	051301030710 (Cumberland River)

Table 4-1. HUC-12 Drainage Areas are Nested Within HUC-10 Drainages. *NRCS worked with USGS to delineate the HUC-10 and HUC-12 drainage boundaries.*

4.2.A. 0513010305.

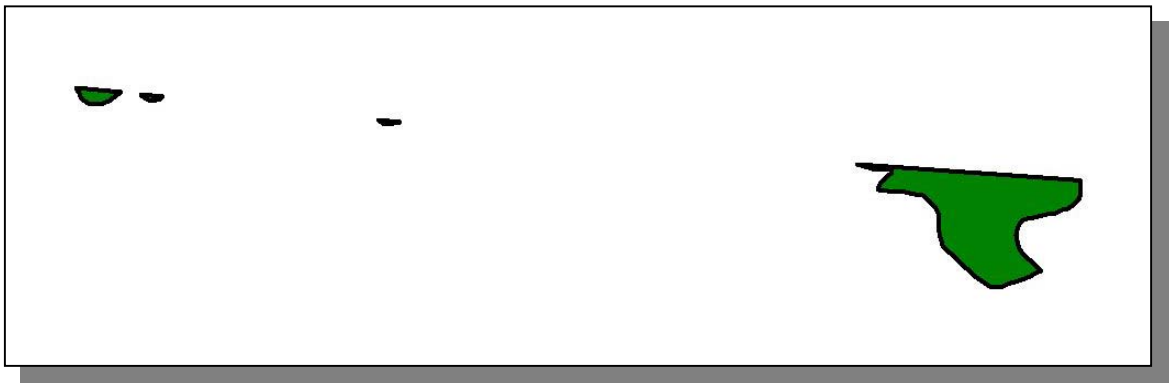

Figure 4-2. Location of Subwatershed 0513010305. *All Upper Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.A.i. 051301030501 (Otter Creek).

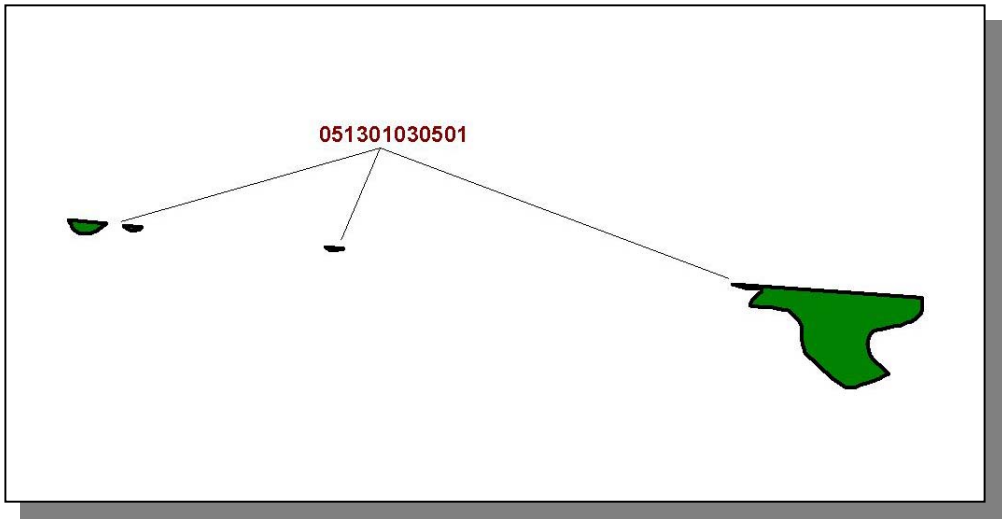

Figure 4-3. Location of Subwatershed 051301030501. *All Upper Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

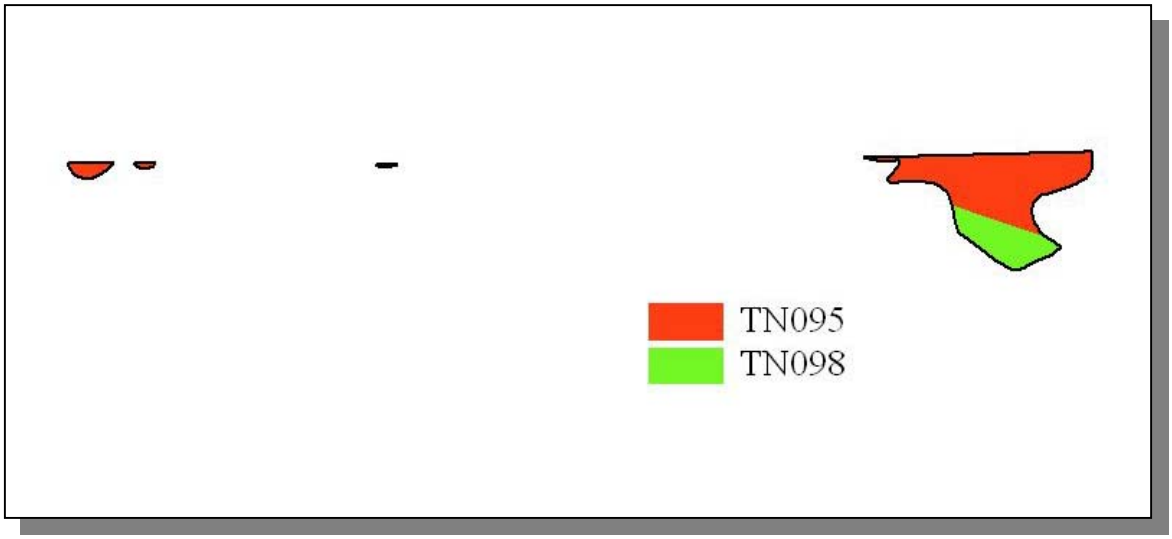

Figure 4-4. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030501.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN095	0.00	B	2.35	5.12	Loam	0.31
TN098	1.00	C	3.98	4.82	Loam	0.32

Table 4-2. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030501. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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4.2.A.i.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.A.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS					
County	Beef Cow	Cattle	Milk Cow	Chickens (Layers)	Hogs
Pickett	5,986	10,864	19	285	99

Table 4-3. Summary of Livestock Count Estimates in Pickett County. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Pickett	68.4	68.4	0.2	0.6

Table 4-4. Forest Acreage and Annual Removal Rates (1987-1994) in Pickett County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.10
Grass (Hayland)	0.11
Legumes, Grass (Hayland)	0.07
Grass, Forbs, Legumes (Mixed Pasture)	0.70
Tobacco (Row Crops)	23.18
Farmsteads and Ranch Headquarters	7.41

Table 4-5. Annual Estimated Total Soil Loss in Subwatershed 051301030501.

4.2.B. 0513010307.

Figure 4-5. Location of Subwatershed 0513010307. *All Upper Cumberland River HUC-10 subwatershed boundaries in Tennessee are shown for reference.*

4.2.B.i. 051301030708 (Kettle Creek).

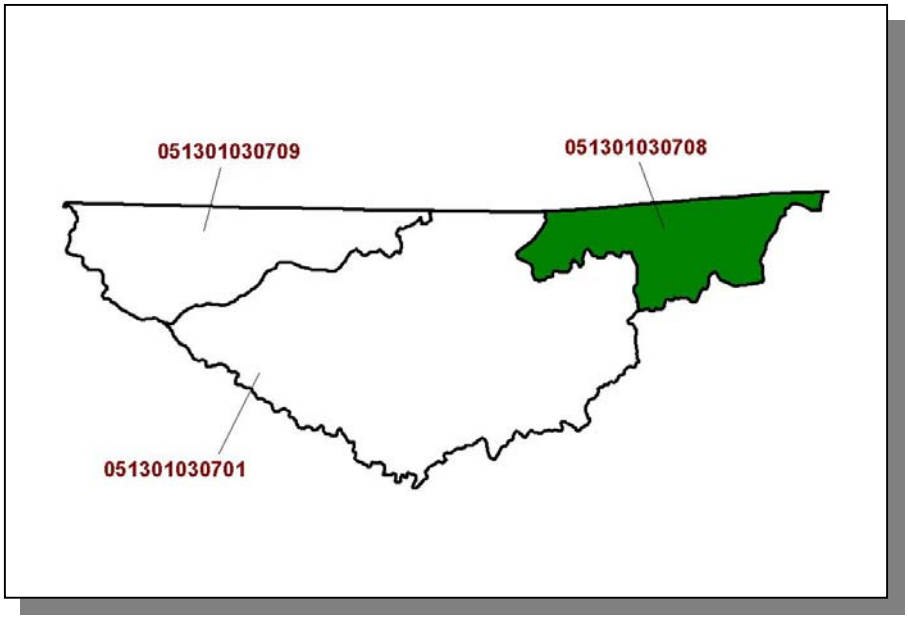

Figure 4-6. Location of Subwatershed 051301030708. *All Upper Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

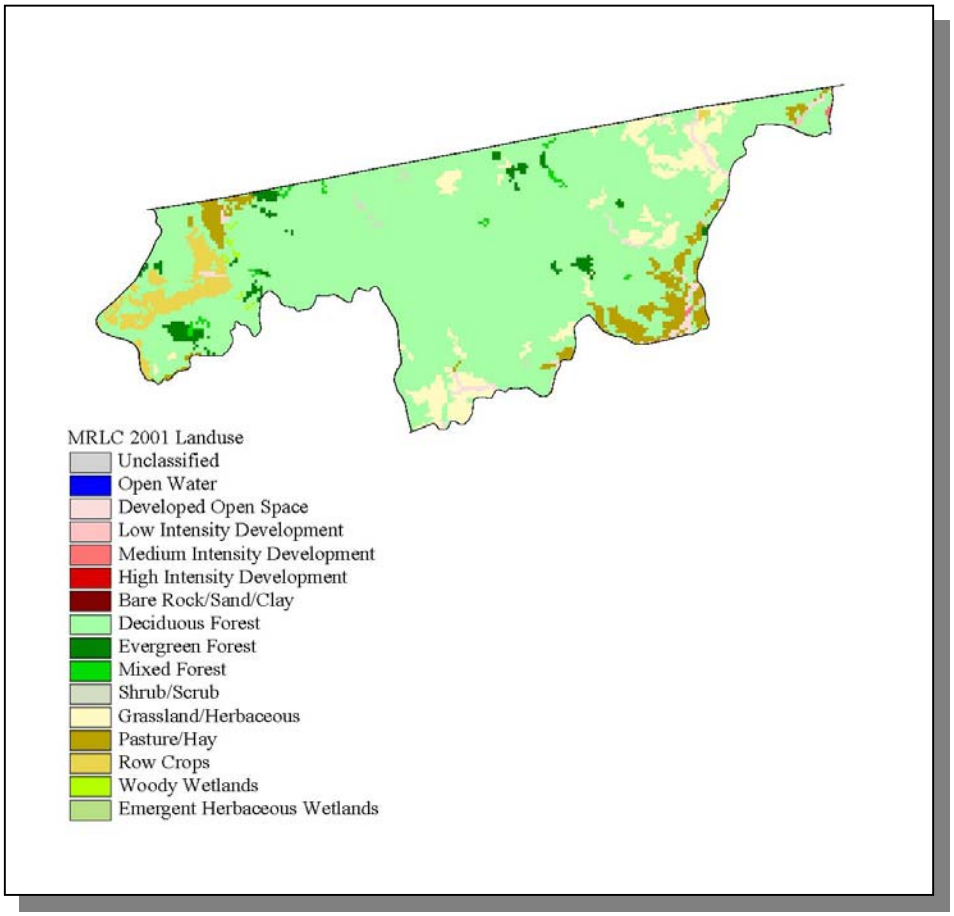

Figure 4-7. Illustration of Land Use Distribution in Subwatershed 051301030708.

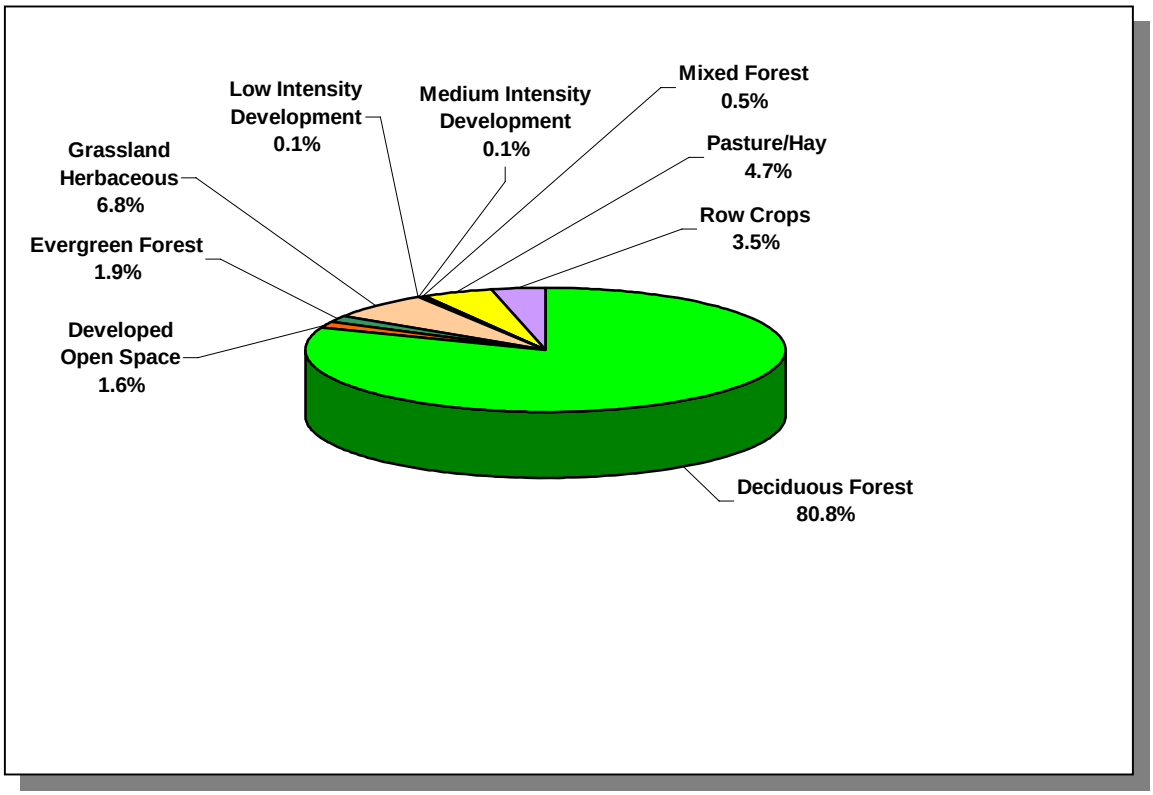

Figure 4-8. Land Use Distribution in Subwatershed 051301030708. *More information is provided in Appendix IV.*

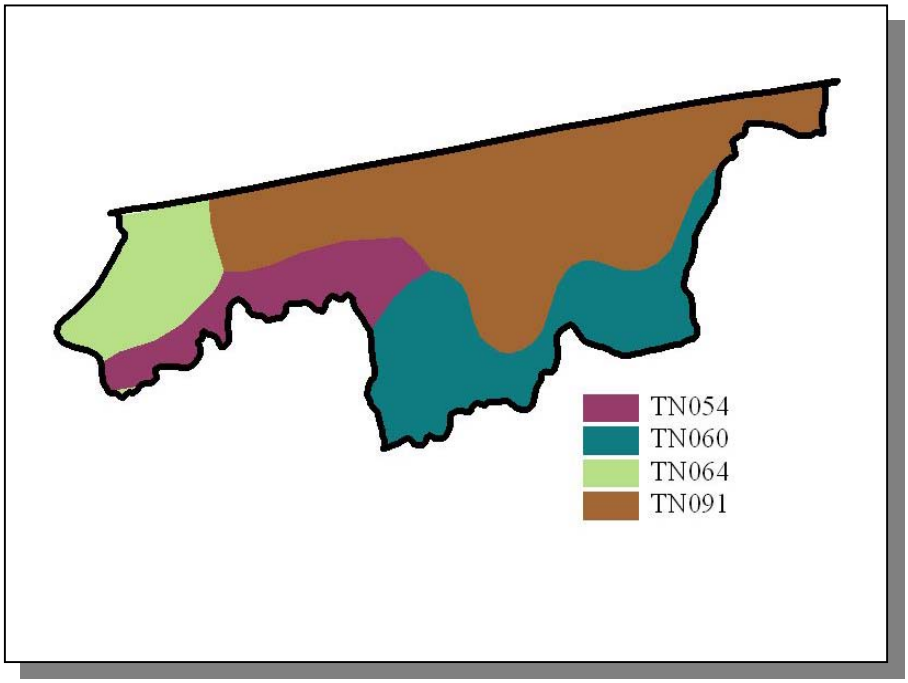

Figure 4-9. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030708.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN064	7.00	C	1.19	5.82	Silty Loam	0.37
TN091	0.00	B	2.95	5.86	Loam	0.34

Table 4-6. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030708. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	1.99	144	145	158	9.7

Table 4-7. Population Estimates in Subwatershed 051301030708.

4.2.B.i.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.B.i.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS	
Cattle	Hogs
95	<5

Table 4-8. Summary of Livestock Count Estimates in Subwatershed 051301030708. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS				
County	Cattle	Chickens (Layers)	Hogs	Sheep
Clay	14,574	18	174	23

Table 4-9. Summary of Livestock Count Estimates in Clay County. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1

Table 4-10. Forest Acreage and Annual Removal Rates (1987-1994) in Clay County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.14
Grass (Hayland)	0.40
Legumes, Grass (Hayland)	0.53
Grass, Forbs, Legumes (Mixed Pasture)	1.38
Tobacco (Row Crops)	28.52
Farmsteads and Ranch Headquarters	1.56

Table 4-11. Annual Estimated Total Soil Loss in Subwatershed 051301030708.

4.2.B.ii. 051301030709 (McFarland Creek).

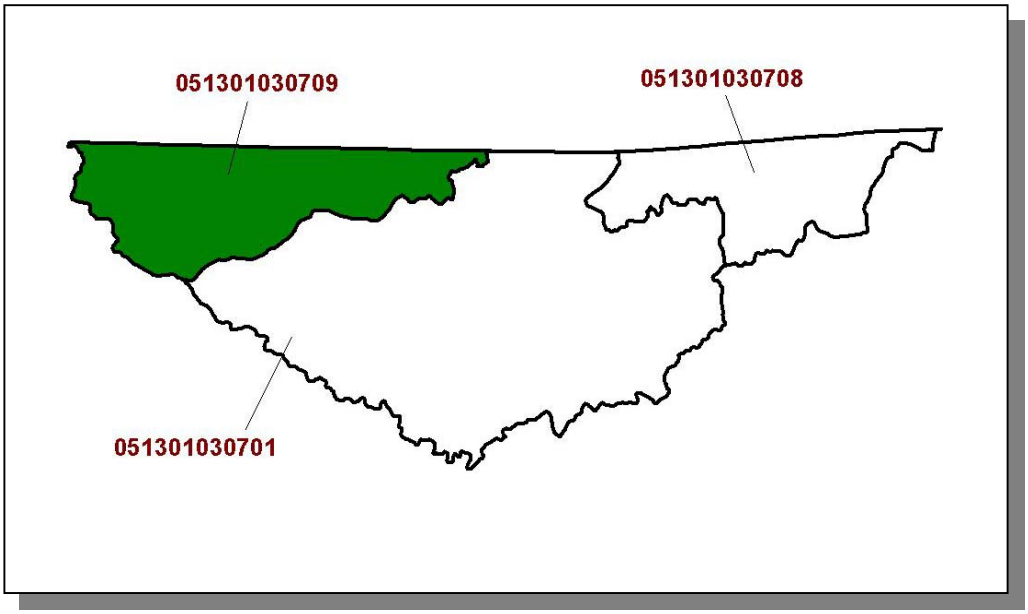

Figure 4-10. Location of Subwatershed 051301030709. *All Upper Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

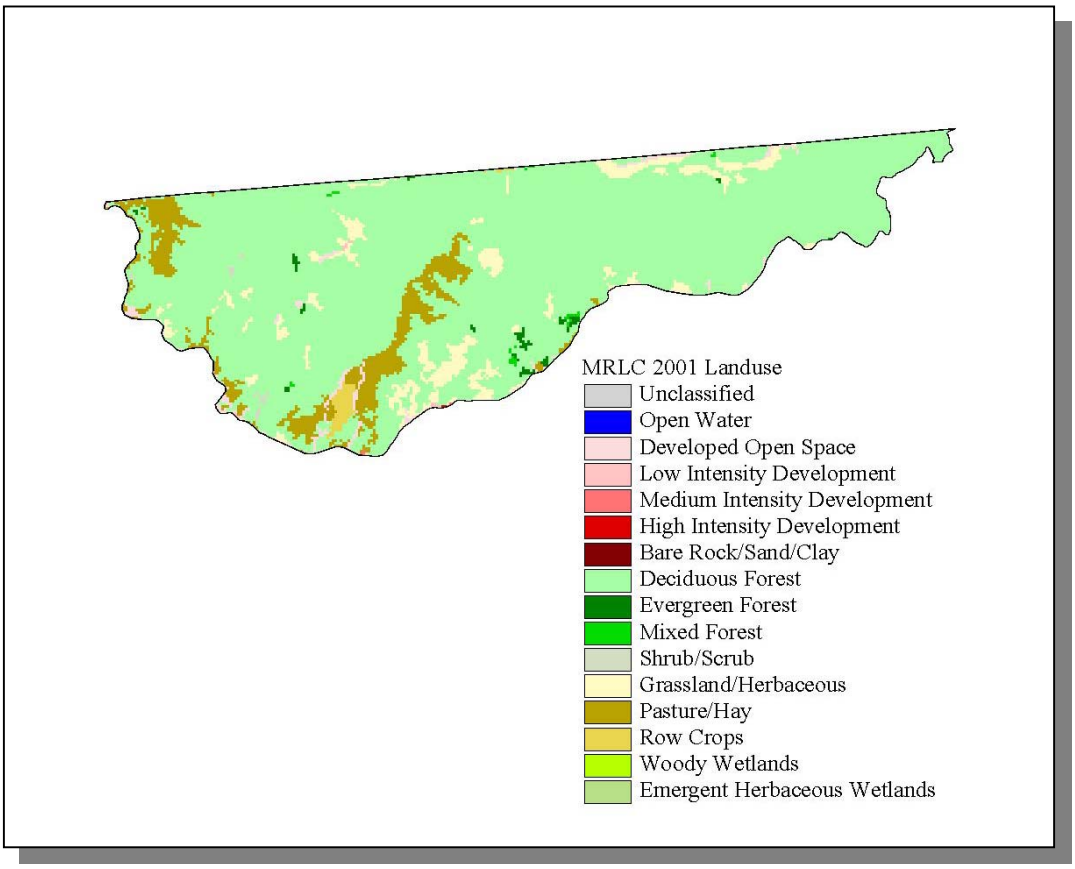

Figure 4-11. Illustration of Land Use Distribution in Subwatershed 051301030709.

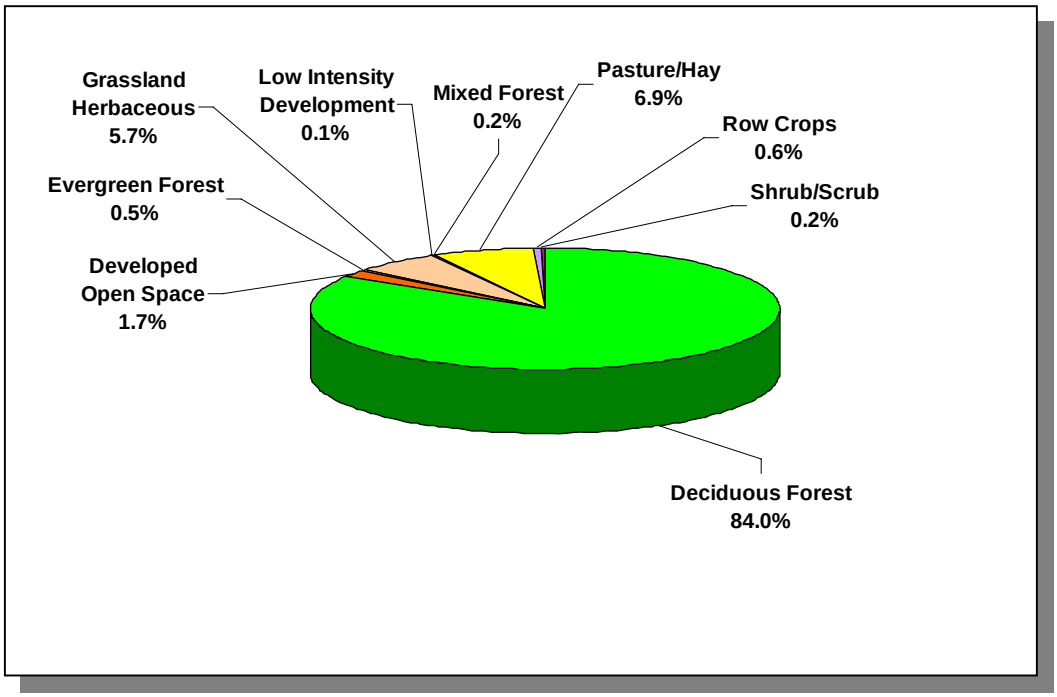

Figure 4-12. Land Use Distribution in Subwatershed 051301030709. *More information is provided in Appendix IV.*

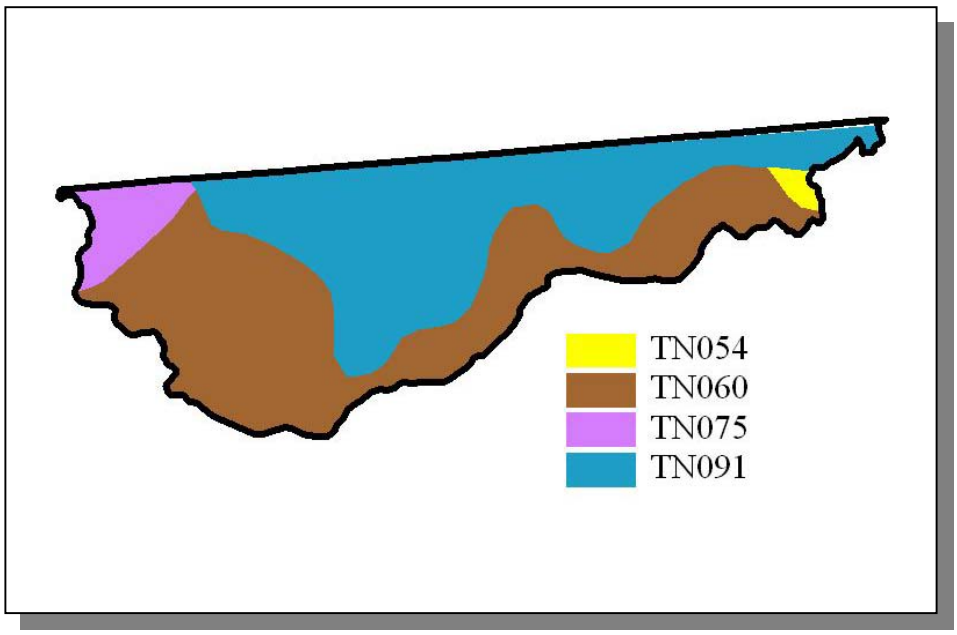

Figure 4-13. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030709.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN075	0.00	B	1.33	5.24	Loam	0.31
TN091	0.00	B	2.95	5.86	Loam	0.34

Table 4-12. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030709. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	2.72	197	199	217	10.2

Table 4-13. Population Estimates in Subwatershed 051301030709.

4.2.B.ii.a. Point Source Contributions.

There are no point source contributions in this subwatershed.

4.2.B.ii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS	
Cattle	Hogs
190	<5

Table 4-14. Summary of Livestock Count Estimates in Subwatershed 051301030709. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves.*

LIVESTOCK COUNTS				
County	Cattle	Chickens (Layers)	Hogs	Sheep
Clay	14,574	18	174	23

Table 4-15. Summary of Livestock Count Estimates in Clay County. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1

Table 4-16. Forest Acreage and Annual Removal Rates (1987-1994) in Clay County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.14
Grass (Hayland)	0.40
Legumes, Grass (Hayland)	0.53
Grass, Forbs, Legumes (Mixed Pasture)	1.38
Tobacco (Close-Grown Cropland)	28.52
Farmsteads and Ranch Headquarters	1.56

Table 4-17. Annual Estimated Total Soil Loss in Subwatershed 051301030709.

4.2.B.iii. 051301030710 (Cumberland River).

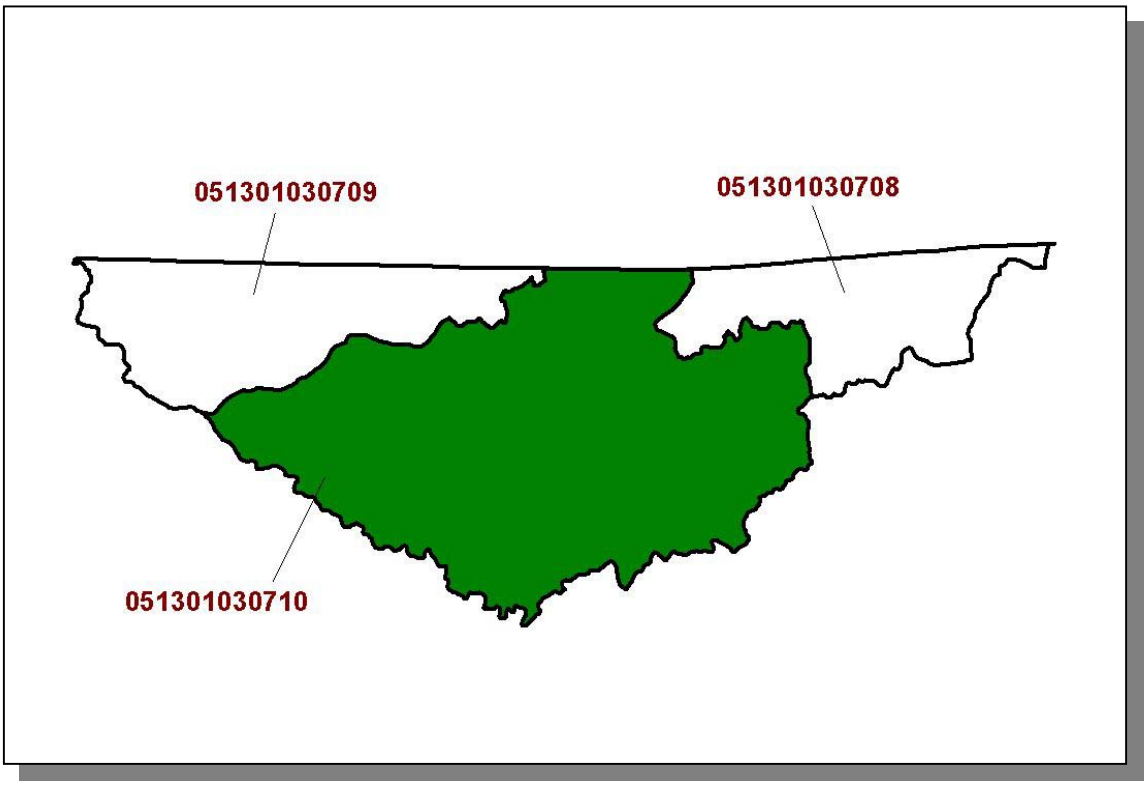

Figure 4-14. Location of Subwatershed 051301030710. *All Upper Cumberland River HUC-12 subwatershed boundaries in Tennessee are shown for reference.*

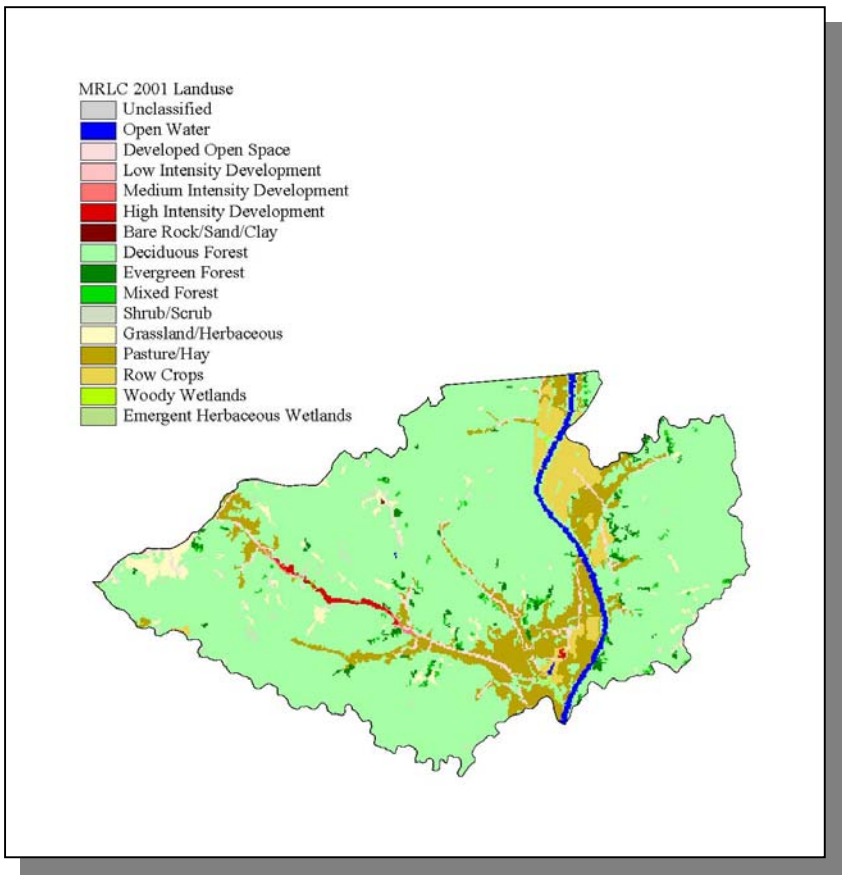

Figure 4-15. Illustration of Land Use Distribution in Subwatershed 051301030710.

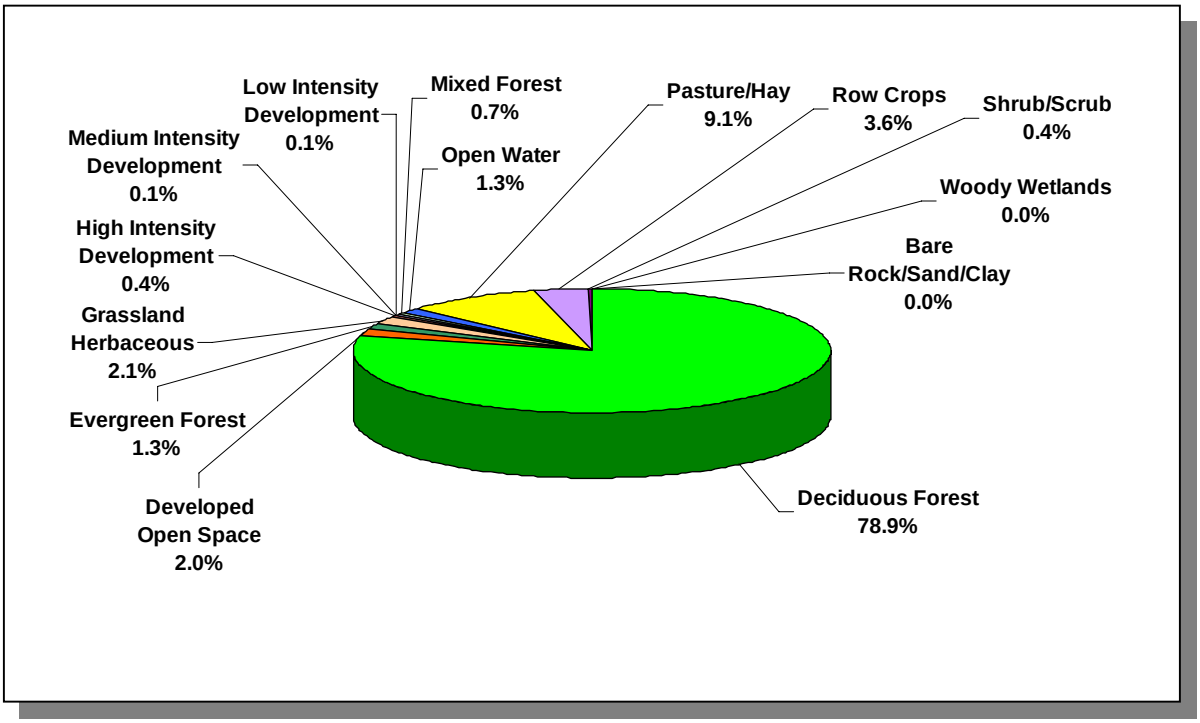

Figure 4-16. Land Use Distribution in Subwatershed 051301030710. *More information is provided in Appendix IV.*

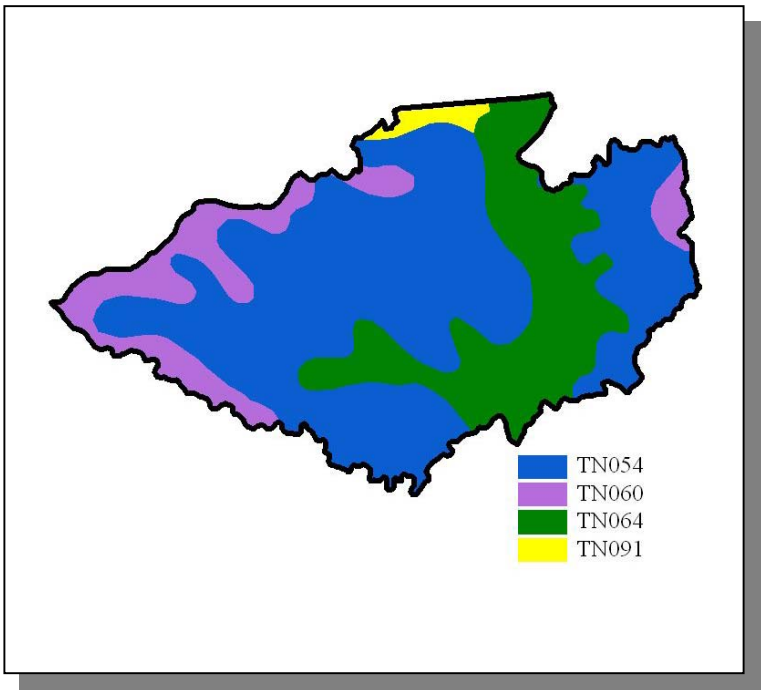

Figure 4-17. STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030710.

STATSGO MAP UNIT ID	PERCENT HYDRIC	HYDROLOGIC GROUP	PERMEABILITY (in/hour)	SOIL pH	ESTIMATED SOIL TEXTURE	SOIL ERODIBILITY
TN054	0.00	C	3.04	4.84	Loam	0.32
TN060	5.00	B	1.30	5.32	Silty Loam	0.39
TN064	7.00	C	1.19	5.82	Silty Loam	0.37
TN091	0.00	B	2.95	5.86	Loam	0.34

Table 4-18. Soil Characteristics by STATSGO (State Soil Geographic Database) Soil Map Units in Subwatershed 051301030710. *The definition of "Hydrologic Group" is provided in Appendix IV.*

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	COUNTY POPULATION				ESTIMATED POPULATION IN WATERSHED			
County	1990	1997	2000	Portion of Watershed (%)	1990	1997	2000	% Change (1990-2000)
Clay	7,238	7,311	7,976	8.08	585	591	645	10.3

Table 4-19. Population Estimates in Subwatershed 051301030710.

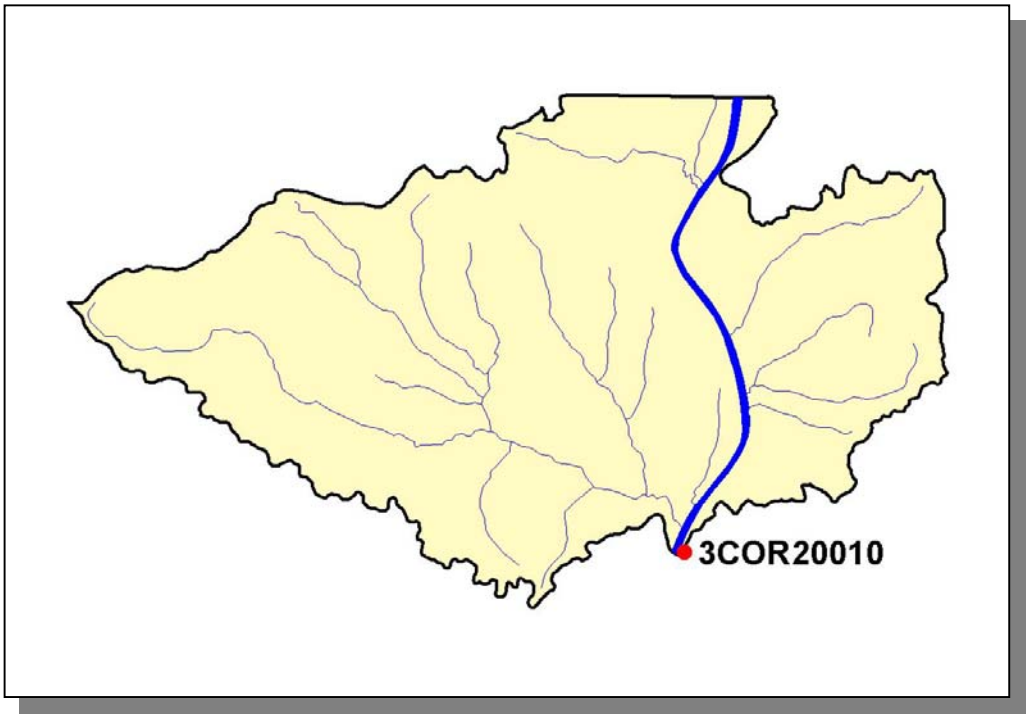

Figure 4-18. Location of Monitoring Sites in EPA's STORET Database in the Tennessee Portion of Subwatershed 051301030710. *More information, including site names and locations, and station numbers for sites located in the watershed outside of Tennessee, is provided in Appendix IV.*

4.2.B.iii.a. Point Source Contributions.

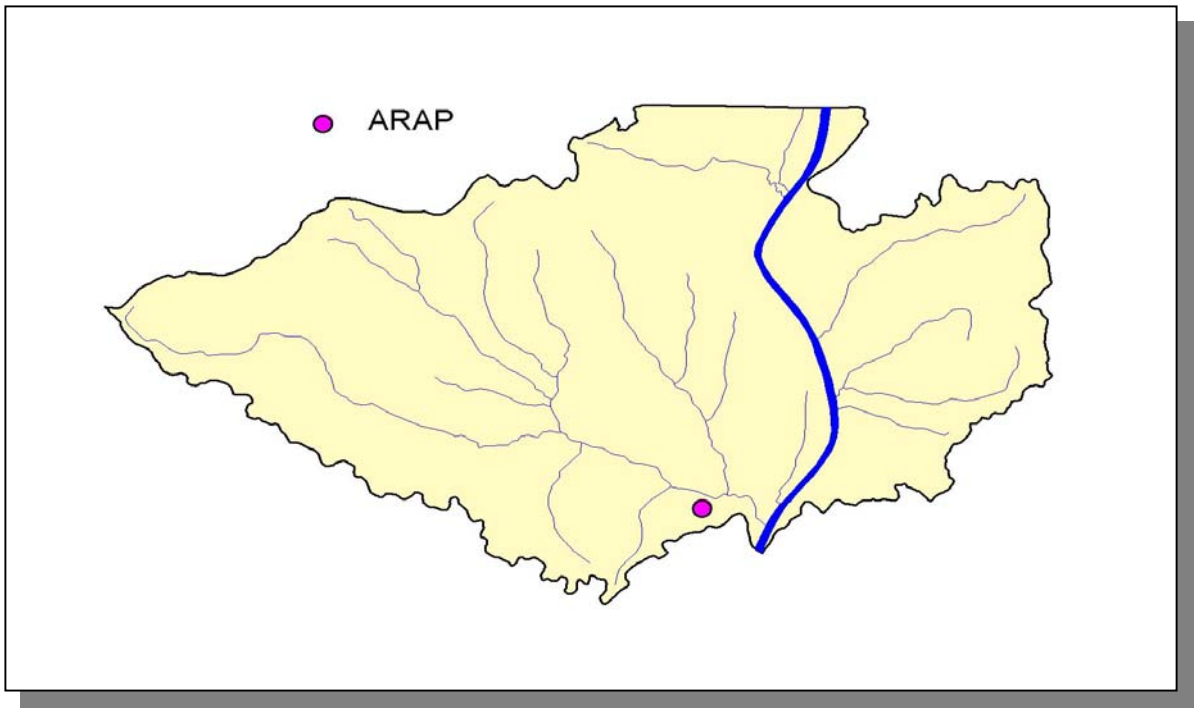

Figure 4-19. Location of Permits Issued in Subwatershed 051301030710. *More information, including the names of facilities, is provided in Appendix IV.*

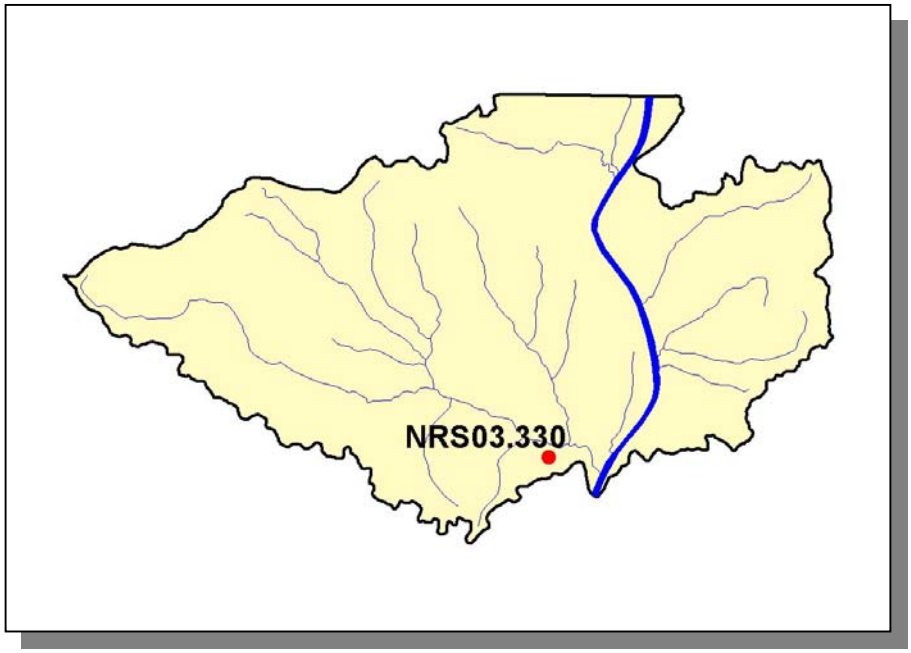

Figure 4-20. Location of Aquatic Resource Alteration Permit (ARAP) Sites (Individual Permits) in Subwatershed 051301030710. *More information is provided in Appendix IV.*

4.2.B.iii.b. Nonpoint Source Contributions.

LIVESTOCK COUNTS			
Beef Cow	Chickens (Layers)	Hogs	Sheep
750	<5	9	<5

Table 4-20. Summary of Livestock Count Estimates in Subwatershed 051301030710. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

LIVESTOCK COUNTS				
County	Cattle	Cickens (Layers)	Hogs	Sheep
Clay	14,574	18	174	23

Table 4-21. Summary of Livestock Count Estimates in Clay County. *According to the 1997 Census of Agriculture (http://www.nass.usda.gov/census/), "Cattle" includes heifers, heifer calves, steers, bulls and bull calves; "Chickens" are layers 20 weeks and older.*

	INVENTORY		REMOVAL RATE	
County	Forest Land (thousand acres)	Timber Land (thousand acres)	Growing Stock (million cubic feet)	Sawtimber (million board feet)
Clay	105.1	105.1	2.3	10.1

Table 4-22. Forest Acreage and Annual Removal Rates (1987-1994) in Clay County.

CROPS	TONS/ACRE/YEAR
Grass (Pastureland)	1.14
Grass (Hayland)	0.40
Legumes, Grass (Hayland)	0.53
Grass, Forbs, Legumes (Mixed Pasture)	1.38
Tobacco (Row Crops)	28.52
Farmsteads and Ranch Headquarters	1.56

Table 4-23. Annual Estimated Total Soil Loss in Subwatershed 051301030710.